

WHAT IS CLAIMED IS:

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1. Display apparatus comprising:
electron emission elements aligned in a matrix
on a substrate and driven by column lines and row
lines;
 - 5 a column line drive unit for driving the column
lines in a pulse width modulation manner by applying
to each column line one of pulses which have
different pulse widths respectively corresponding to
10 gradation levels of a luminance signal to be
displayed in the display apparatus;
 - 15 a row line drive unit for sequentially driving
the row lines;
 - 20 first means for defining a plurality of blocks
each of which includes at least one column line by
dividing the column lines and a plurality of
gradation steps each of which includes at least one
gradation level by dividing the gradation levels,
and detecting a block driving status which indicates
how the gradation levels in each of the gradation
steps are applied to the columns in each block; and
 - 25 second means for defining a plurality of
periods within one horizontal interval, the periods
being associated with widths of approximating pulses
corresponding respectively to the gradation steps,
calculating a voltage drop due to a resistance in
the row line and the current flow by the

approximating pulses on the column lines during each of the defined periods on the basis of the detected block driving status, determining a block voltage drop for each block estimated from the voltage drops over the plurality of periods, and modifying the luminance signal for each block according to the determined block voltage drop.

2. The display apparatus according to Claim 1,
10 wherein said first means detects the block driving status for each block by setting subintervals in one horizontal interval each of which corresponds to each block and compares the luminance signal with the gradation steps during each of the subintervals.

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3. The display apparatus according to Claim 2,
wherein said first means detects the block driving status which indicates how many column lines in the block have the gradation levels in each of the
20 gradation steps.

4. The display apparatus according to Claim 1,
wherein said column drive unit adds a correction data according to the determined block voltage drops
25 to the luminance signal in driving each column line with the luminance signal \the change the pulse width.

5. The display apparatus according to Claim 1,
wherein said column drive unit produces output
voltages varied according to the determined block
voltage drops.

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6. The display apparatus according to Claim 5,
said column line drive unit includes output circuits
provided for the respective column lines and each
output circuit selects either one of a plurality of
10 voltage supply units having different output
potentials, and a peak value of a pulse applied to
each column line is determined by a potential of the
selected voltage supply unit.

15 7. The display apparatus according to Claim 1,
wherein said second means modifies the luminance
signal for each block by getting a correction data
for each column in the block through a linear
interpolation and applying the correction data to
20 the column line.

8. The display apparatus according to one of
Claims 1 to 7, wherein said row line drive unit
comprises two subunits provided on both sides of the
25 row lines and said subunits apply an equal voltage
at the same timing to each row line.

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~~9.~~ The display apparatus according to one of Claims 1 to 8, wherein said electron emission element is a type of cold cathode.

5 ~~10.~~ The display apparatus according to Claim 9, wherein said electron emission element is a type of surface conduction electron emission.

10 ~~11. A method of driving display apparatus comprising electron emission elements aligned in a matrix on a substrate and driven by column lines and row lines, a column line drive unit for driving the column lines in a pulse width modulation manner by applying to each column line one of pulses which have different pulse widths respectively corresponding to gradation levels of a luminance signal to be displayed in the display apparatus and a row line drive unit for sequentially driving the row lines, comprising the steps of:~~

15 ~~20. calculating a voltage drop due to a resistance in the row line and the current flow by the pulse widths on the column lines, and~~

20 ~~modifying the luminance signal according to the calculated voltage drop so that for the same luminance data, a width of a pulse applied to a column line is longer as the column line is aligned more distant from the row line drive unit.~~

12. A method for driving display apparatus comprising electron emission elements aligned in a matrix on a substrate and driven by column lines and row lines; a column line drive unit for driving the 5 column lines in a pulse width modulation manner by applying to each column line one of pulses which have different pulse widths respectively corresponding to gradation levels of a luminance signal to be displayed in the display apparatus, and 10 a row line drive unit for sequentially driving the row lines, comprising the steps of:

defining a plurality of blocks each of which includes at least one column line by dividing the column lines and a plurality of gradation steps each 15 of which includes at least one gradation level by dividing the gradation levels;

detecting a block driving status which indicates how the gradation levels in each of the gradation steps are applied to the columns in each 20 block;

defining a plurality of periods within one horizontal interval, the periods being associated with widths of approximating pulses corresponding respectively to the gradation steps;

25 calculating a voltage drop due to a resistance in the row line and the current flow by the approximating pulses on the column lines during each

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of the defined periods on the basis of the detected block driving status, determining a block voltage drop for each block estimated from the voltage drops over the plurality of periods; and

5 modifying the luminance signal for each block according to the determined block voltage drop.

13. The method according to Claim 12, wherein said detecting step detects the block driving status 10 for each block by setting subintervals in one horizontal interval each of which corresponds to each block and compares the luminance signal with the gradation steps during each of the subintervals.

15 14. The method according to Claim 13, wherein said detecting step detects the block driving status which indicates how many column lines in the block have the gradation levels in each of the gradation steps.

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15. The method according to Claim 1, wherein the luminance signal for each block is modified by getting a correction data for each column in the block through a linear interpolation and the 25 correction data is applied to the column line.